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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/295,607	04/22/1999	SHUNPEI YAMAZAKI	0756-1961	7371

7590 08/09/2006

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EXAMINER

LOKE, STEVEN HO YIN

ART UNIT PAPER NUMBER

2811

DATE MAILED: 08/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 09/295,607	Applicant(s) YAMAZAKI ET AL.	
	Examiner Steven Loke	Art Unit 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 2/17/06, 5/24/06.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 2,3,6-8,11,12,15-17,19-35 and 37-67 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 2,3,6,8,11,12,15,17,19-33,35,37-45 and 47-67 is/are allowed.
- 6) ☒ Claim(s) 7,16,34 and 46 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☒ Certified copies of the priority documents have been received in Application No. 08/085,931.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>6/17/05, 11/8/05</u> | 6) <input checked="" type="checkbox"/> Other: <u>IDS (7/25/06)</u>                      |

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1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 7, 16, 34 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito in view of Serikawa et al., further in view of Werdecker et al.

In regards to claim 7, Ito discloses a semiconductor device in figs. 1 and 4. It comprising: a substrate [30c] having a front surface and a rear surface; a composite insulating film [30b, 32] comprising aluminum nitride (AlN) [32] (AlN is an insulating material when no mechanical pressure is applied on it) and oxygen (oxygen in silicon dioxide [30b]) provided under said rear surface of the substrate; and a transistor (the MOSFET in circuit [40]) provided over said front surface of the substrate, said transistor having at least a channel formation region comprising silicon, a gate insulating film [92] adjacent to said channel formation region, and a gate electrode [90] adjacent to said channel formation region with said gate insulating film interposed therebetween.

Ito differs from the claimed invention by not showing the channel formation region comprising crystalline silicon.

Serikawa et al. disclose the channel formation region [14] comprising crystalline silicon (poly Si) in fig. 4D.

Since both Ito and Serikawa et al. teach a thin film transistor structure, it would have been obvious to have the crystalline silicon of Serikawa et al. in Ito because it improves the carrier mobility of the device.

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Ito further differs from the claimed invention by not showing said insulating film comprising aluminum nitride has a thermal conductivity of higher than 0.6 W/cm K (i.e., higher than 60 W/m K).

Werdecker et al. disclose the aluminum nitride (AlN) ceramic insulating film has a thermal conductivity of 110 to 170 W/m K in Table II (page 402).

Since both Ito and Werdecker et al. teach an AlN insulating film, it would have been obvious to have the AlN insulating film of Werdecker et al. in Ito because it improves heat dissipation.

In regards to claim 16, Ito discloses the substrate is glass (silicon dioxide [30c] is a glass material).

In regards to claim 34, the combined device differs from the claimed invention by not showing the aluminum nitride has a thickness of 100 angstroms to 5000 angstroms.

It would have been obvious to one having ordinary skill in the art at the time the invention was made for the aluminum nitride has a thickness of 100 angstroms to 5000 angstroms, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

In regards to claim 46, Serikawa et al. disclose said channel formation region [14] is crystallized by laser irradiation through a layer comprising silicon oxide [15] on said channel formation region (figs. 4A and 4B).

3. Claims 2, 3, 6, 8, 11, 12, 15, 17, 19-33, 35, 37-45, 47-67 are allowed.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven Loke whose telephone number is (571) 272-1657. The examiner can normally be reached on 8:00 am to 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (571) 272-1732. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

sl

August 5, 2006

Steven Loke  
Primary Examiner  
